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(1)

METHOD FOR MANUFACTURING MARBLED MEAT

[Shimofuriniku No Seizoho]

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Claims

1. A method for manufacturing a marbled meat, characterized by the fact that a fat emulsion containing fat in a solid state at normal temperature at 5-30 parts by weight is almost uniformly diffused into meat at 100 parts by weight; and the fat in the emulsion is precipitated into the meat by cooling said meat.

2. The method for manufacturing a marbled meat of Claim 1, characterized by the fact that after injecting the fat emulsion into the meat by an injector equipped with injection needles, said emulsion is almost uniformly diffused into said meat by mechanically kneading said meat.

3. The method for manufacturing a marbled meat of Claim 1, characterized by the fact that a fat emulsion in a solid state at normal temperature in which an animal fat and a plant fat are mixed is used.

4. The method for manufacturing a marbled meat of Claim 1, characterized by the fact that the emulsion includes a gelling agent.

[1] Numbers in the margin indicate pagination in the foreign text.

Detailed explanation of the invention

The present invention pertains to a method for manufacturing a marbled meat. More specifically, the present invention pertains to a method for manufacturing a marbled meat that injects and disperses a fat into meat with less fat. In Japan, the meat in which a fat is dispersed in a frost drop shape into metal is called a marbled shape and is considered valuable as a high-quality meat. However, the amount of marbled meat being occupied in the whole meat is very small.

The purpose of the present invention is to manufacture a marbled meat from a large amount of lean meat with less fat.

As a result of earnest researches, this inventor completed the method for manufacturing a marbled meat for the first time.

Furthermore, old cow meats such as multiparous cows after finishing milking are so hard that they cannot be eaten. For this reason, fresh beefs are merely provided as only minced meats for table use. If the present invention is applied to these meats, not only the taste and the appearance are improved, but the meats are extremely softened, so that they can be used as high-quality meats for steak. A second purpose of the present invention is to change a low-quality meat to a very soft high-quality meat.

In the present invention, a fat is dispersed in a marbled shape into a lean meat. Specifically, a fat emulsion containing fat in a solid state at normal temperature at 5-30 parts by weight is almost uniformly diffused into meat at 100 parts by weight, and the fat in the emulsion is precipitated into the meat by cooling said meat.

As the raw material meat of the present invention, horsemeat, mutton, and other animal meats can be used in addition to beefs and old cow meats with less fat. Also, as the fat being used in the present invention, animal and plant fats can be used. In order to form the marbled pattern which is an objective of the present invention, a white solid is preferable at normal temperature or refrigerator temperature. In particular, in case a marbled meat beef is manufactured, it is most natural that beef tallow is used in terms of taste. Since the beef tallow is solid at normal temperature, it is preferably used by mixing with a fat with a low melting point, for example, a plant fat such as salad oil, since the adjustment of the emulsion is easy, the temperature of the emulsion can be lowered, and mellowness is given to the taste. The /2 temperature of the emulsion being injected into the meat is preferably as low as possible since the meat quality is not lowered. In this case, the mixture ratio of the beef tallow and

the plant fat can be freely selected, and the plant fat is preferably mixed at 80-120 parts by weight to the beef tallow at 100 parts by weight. Since this mixture is solidified at normal temperature, a marbled pattern is formed.

The fat emulsion being used in the present invention is adjusted by adding an emulsifier at 0.5-4 parts by weight to a mixture of fat at 60 parts by weight and water at 40 parts by weight, for instance. If the amount of fat is increased, the emulsified state is unstable. The fat is heated to its melting point or higher and added into water at the same temperature in which the emulsifier is dissolved while stirring, and the emulsion is adjusted.

As the emulsifier being used in the emulsion of the present invention, all the emulsifiers that can be provided for table use starting with casein sodium, gluten, protein hydrolysate, and natural gum can be used.

In the emulsion of the present invention, it is preferable to add phosphate and a detasting agent of phosphate such as starch decomposed product in addition to the emulsifier. Since the phosphate relaxes the muscle fibers in the meat, the emulsion permeates easily into the meat. In the emulsion of the present invention, in addition to that, flavor, perfume, antiseptic, colorant, and other food additives can be added.

In the emulsion of the present invention, it is very effective to further add a gelling agent such as water-soluble gelatin that can be provided for table use. Such a gelling agent sets the inside of the meat into which the fat is permeated to a purine state, it fixes the fat precipitated in the meat and prevents its dispersion.

As a means for nearly uniformly diffusing the fat emulsion into the meat in the manufacturing method of the present invention, various methods can be used. As the most efficient method, a method that uniformly diffuses an aggregate of the emulsion maldistributed in the meat into the meat tissues by dispersing and injecting the emulsion into the meat, if possible, and mechanically kneading the meat from the outside can be used. For this reason, this inventor adopted a method that puts the fat emulsion into the injector equipped with lots of injection needles used for manufacturing hams, injects the emulsion into each position in the meat via the injection needles, and kneads the meat by a rotary massaging machine being used for manufacturing hams. Though it is preferable to disperse the injection of the emulsion through the injection needles, if possible, the injection needles may be stuck at an interval of ordinarily about 1 cm into the surface of the meat. Then, the tips of the injection needles are adjusted in

accordance with the thickness of a gobbet of meat so that they may be set to almost the central part of the meat.

The amount of fat emulsion being injected can be changed as desired. In accordance with the fat content in the marbled mat of the product, a calculated amount may be injected based on the fat content in the emulsion being used. Usually, said emulsion at 10-30 parts by weight is injected to the amount of meat at 100 parts by weight.

The kneading operation called tumbling using the rotary massaging machine is carried out until the fat emulsion is generally uniformly diffused, however when said machine is used, the operation for 5-10 min is sufficient.

In the manufacturing method of the present invention, a process that breaks the emulsified state of the fat emulsion nearly uniformly dispersed in this manner by cooling and precipitates the fat in a so-called marbled shape of a spot shape or stripe shape in the meat is required. On the other hand, the fat emulsion of the present invention is usually injected at a temperature of normal temperature or higher. For this reason, it is very preferable to immediately cool the fat emulsion after diffusing by tumbling in terms of storage of the meat quality. The cooling temperature depends on the usage

shape of the product, however a temperature of 15-40°C, especially 5-35°C is appropriate.

Thus, with the use of the present invention, the fat can be included at a desired ratio in a marbled shape into the raw material meat. In accordance with the preference of consumers, the fat can be included at usually 5-30 parts by weight, preferably 10-25 parts by weight to the raw material meat at 100 parts by weight.

The marbled meat obtained by the manufacturing method of the present invention exhibits a marbled appearance as indicated by the name, and since the ratio of the fat in a lean meat is increased, the taste is also increased more. Furthermore, the meat quality is improved to a very soft meat by relaxing between the fibers of the meat. Thus, the usefulness of the present invention is very high.

Application Example 1

A refrigerated thigh meat of a multiparous cow of Holstein species having a milking period of 10 years was thawed until its central temperature reached 1°C. After a shaping operation for stripping off the muscles of the meat, a tendering operation for cutting the muscles by a saber saw was carried out. A fat emulsion at 20 parts by weight was injected into the gobbet of/3 meat at 100 parts by weight by an injector equipped with lots of

injection needles. Said fat emulsion was prepared by adding a beef tallow at 49 parts by weight heated at 60-70°C into water at 49 parts by weight at 60-70°C containing an emulsion additive at 2 parts by weight while stirring. The emulsion additive used here had a composition of casein sodium at 40 parts by weight, protein hydrolysate at 24 parts by weight, natural gum at 5 parts by weight, phosphate at 16 parts by weight, starch decomposed product at 14 parts by weight, and water-soluble gelatin at 1 part by weight.

After injecting said emulsion, said emulsion was immediately diffused into the entire meat by heavily applying a tumbling operation for 5 min using a rotary massaging machine. The gobbet of said meat was preliminarily shaped in a rod shape, frozen at -30°C, and stored. Then, after raising the temperature of the gobbet of said meat up to -5°C, the meat was sliced, so that a meat for steak showing a marbled pattern in a cut cross section was obtained. The meat for steak obtained here and the meat used as its raw material were cooked by the same method, so that steaks were made. The steak made of the raw material meat could not be bitten off at all, like a rubber, whereas the steak obtained by this application example was a very soft tasty steak.

For the marbled meat of the present invention in this application example and the raw material meat, the shear value as a soft scale, the taste characteristic, and the degree of oxidation were measured, and the following results were obtained.

(1) Shear value

For the marbled meat of the present invention and the raw material meat, the shear values of 8 times were respectively measured, and their average values were attained.

As the shear value, using a rheometer (made by Fudo Kogyo K.K., NRM-1002 type), the tested material was sheared by applying a load, the load during shearing was continuously plotted on a recording paper with respect to the time, and the area enclosed with the time axis on the coordinates and the plotted curve was measured. These shear tests were carried out under the same shape of the tested materials and the same shear conditions.

Shear value of the marbled meat of the present invention

Average 1.520 cm^2, deviation value 0.289

Shear value of the raw material meat

Average 3.079 cm^2, deviation value 0.492

At a risk rate of 0.01 or less, the marbled meat of the present invention is meaningfully soft.

(2) Taste characteristic

For the taste characteristic of the marbled meat of the present invention and the raw material meat, the functional inspection was carried out by a panel of 18 skilled persons according to a five-step evaluation method.

The number of score of five steps is as follows.

Good: 5 points, slightly good: 4 points, average: 3 points, slightly poor: 2 points, and poor: 1 point

A flavor

Marbled meat of the present invention

Average value 3.722, deviation value 0.460

Raw material meat

Average value 2.888, deviation value 0.323

B Softness

Marbled meat of the present invention

Average value 4.111, deviation value 0.323

Raw material meat

Average value 3.111, deviation value 0.471

C Large juice characteristic

Marbled meat of the present invention

Average value 3.555, deviation value 0.511

Raw material meat

Average value 2.944, deviation value 0.539

D General evaluation

Marbled meat of the present invention

Average value 3.888, deviation value 0.323

Raw material meat

Average value 3.055, deviation value 0.416

Functionally, the marbled meat of the present invention was excellent.

(3) Degree of oxidation

Furthermore, the degree of oxidation of the meat was attained by measuring TBA value.

Marbled meat of the present invention

Right after manufacturing	0.06
After 2 weeks	0.05

Raw material meat

Initial value	0.03
After 2 weeks	0.03

These numerical values show that both of them are not oxidized, even after a lapse of 2 weeks. In other words, the meat quality is not negatively influenced at all by heating when the manufacturing method of the present invention is applied.

The TBA value was measured at a light wavelength of 538 nm according to an ordinary method.

Application Example 2

Using the same emulsion composition ratio as that of Application Example 1, the same operation as that of /4
Application Example 1 except for using an emulsion using a mixture of an equal amount of beef tallow and salad oil instead of beef tallow as a fat and setting the temperature of said emulsion to 20°C was applied to an imported lean meat. The meat obtained in this manner was a soft marbled meat exhibiting a mellow taste.